Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A process for making nanoscale flakes comprising:

providing a vacuum deposition chamber containing a deposition surface;

providing a release coat source and a flake deposition source in the vacuum deposition chamber, each directed toward the deposition surface;

depositing on the deposition surface under vacuum in alternating layers a vaporized polymeric release coat layer from the release coat source and vapor deposited discrete islands of flake material from the flake deposition source to build up in sequence a multi-layer vapor deposit of flake material layers comprising discrete islands of the flake material separated by and deposited on corresponding intervening release coat layers;

the release coat layers comprising a polymeric material which was vaporized under vacuum to form a smooth continuous solvent soluble and dissolvable barrier layer and support surface on which each of the layers of flake material is formed; and

removing the multi-layer vapor deposit from the vacuum deposition chamber and separating it into nanoscale flake particles by treatment with a solvent which dissolves the release coat layers and yields flakes with smooth, flat surfaces which are essentially free of the release coat material.

2. (Original) The process according to claim 1 in which the flake layer comprises a vapor-deposited material selected from the group consisting of metal in elemental form, an inorganic material, and a non-metal.

3. (Original) The process according to claim 2 in which the non-metal comprises silicon monoxide, silicon dioxide or a polymeric material, in which the inorganic material is selected from the group consisting of magnesium fluoride, silicon monoxide, silicon dioxide, aluminum oxide, aluminum fluoride, indium tin oxide, titanium dioxide and zinc sulfide, and in which the metal is selected from the group consisting of aluminum, copper, silver, chromium, indium, nichrome, tin and zinc.

4. (Original) The process according to claim 1 in which the release coat material is selected from styrene or acrylic polymers or blends thereof.

5. (Original) The process according to claim 1 in which the flake layers are deposited to a flake (discrete island) thickness of less than about 100 nanometers.

6. (Original) The process according to claim 1 in which the release coat layer comprises a thermoplastic polymeric material.

7. (Original) The process according to claim 1 in which the release coat layer comprises a lightly cross-linked resinous material which is dissolvable in an organic solvent to yield the flakes which are essentially free of the release material.

8. (Original) The process according to claim 1 in which the release coat layers are dissolvable in an organic solvent.

9. (Original) A process for making flakes comprising:

providing a vacuum deposition chamber containing a deposition surface;

providing a release coat source and a flake deposition source in the vacuum deposition chamber, each directed toward the deposition surface;

depositing on the deposition surface under vacuum in alternating layers a vaporized polymeric release coat layer from the release coat source and a vapor deposited layer of flake material from the flake deposition source to build up in sequence a multi-layer vapor deposit of flake material layers separated by and deposited on corresponding intervening release coat layers;

the release coat layers comprising a polymeric material which was vaporized under vacuum to form a smooth continuous solvent soluble and dissolvable barrier layer and support surface on which each of the layers of flake material is formed;

in which the release coat source comprises a wire feed mechanism in which the polymeric release coat material is coated onto a wire fed to the vacuum chamber and evaporated under heat therein to be deposited as said release coat layer; and

removing the multi-layer vapor deposit from the vacuum chamber deposition and separating it into flakes by treatment with a solvent which dissolves the release coat layers and yields flakes with smooth, flat surfaces which are essentially free of the release coat material.

10. (Original) The process according to claim 9 in which the release coat material is selected from styrene or acrylic polymers or blends thereof.

11. (Original) The process according to claim 9 in which the wire feed mechanism delivers the coated release coat material to a heater block positioned adjacent the deposition surface for evaporating the release coat material.

12. (New) Apparatus for making nanoscale flakes comprising:

a vacuum deposition chamber containing a deposition surface;

a release coat source and a flake deposition source in the vacuum deposition chamber each directed toward the deposition surface;

in which the release coat source and the flake deposition source are controllable and adapted for depositing on the deposition surface under vacuum in alternating layers a vaporized dissolvable polymeric release coat layer from the release coat source and vapor deposited discrete islands of flake material from the flake deposition source to build up in sequence a multi-layer vapor deposit of flake material layers comprising discrete islands of the flake material separated by and deposited on corresponding intervening dissolvable release coat layers;

the release coat layers comprising a polymeric material for being vaporized under vacuum to form a smooth continuous solvent soluble and dissolvable barrier layer and support surface on which each of the layers of flake material is formed;

the multi-layer vapor deposit comprising discrete islands of flake material on dissolvable polymeric release coat layers for being removable from the vacuum deposition chamber and adapted for separating the vapor deposit into nanoscale flake particles by treatment with a solvent which dissolves the release coat layers and yields nanoscale flakes with smooth, flat surfaces which are essentially free of the release coat material.

13. (New) Apparatus according to claim 12 in which the flake layer comprises a vapor-deposited material selected from the group consisting of metal in elemental form, an inorganic material, and a non-metal; and in which the non-metal comprises silicon monoxide, silicon dioxide, or a polymeric material; in which the inorganic material is selected from the group consisting of magnesium fluoride, silicon monoxide, silicon dioxide, aluminum oxide, aluminum fluoride, indium tin oxide, titanium dioxide and zinc sulfide; and in which the metal is selected from the group consisting of aluminum, copper, silver, chromium, indium, nichrome, tin and zinc.

14. (New) Apparatus according to claim 12 in which the flake deposition source deposits the flake material layers to a flake (discrete island) thickness of less than about 100 nanometers.

15. (New) Apparatus according to claim 12 in which the release coat layer comprises a thermoplastic polymeric material.

16. (New) Apparatus according to claim 12, in which:

a high energy radiation source is positioned in the vacuum deposition chamber and directed toward the deposition surface;

the release coat layers comprise a polymeric material of low crosslink density adapted for being vapor deposited on the deposition surface and cured and crosslinked by exposure to the radiation source, forming a release coat layer which is dissolvable in a solvent and which, when vaporized under vacuum and cured, forms the barrier layer and support surface on which each of the flake material layers is formed; and

the multi-layer vapor deposit is removable from the vacuum chamber for being separated it into flakes by treatment with the solvent which dissolves the release coat layers and yields

single layer flakes which are essentially free of the release coat material.

17. (New) Apparatus according to claim 12, in which the polymeric release coat material is melted outside the vacuum chamber and delivered to the chamber where the release coat source comprises a heating device which vaporizes the release coat material, and in which the vaporized release coat material is conveyed to the deposition surface and deposited thereon to form said release coat layer; and in which the flake deposition source comprises a thermal source in the vacuum chamber for evaporating the flake material.

18. (New) Apparatus according to claim 17, including a differential pressure area produced adjacent the heating device and the deposition surface to prevent the escape of vapor toward the thermal source.

19. (New) Apparatus according to claim 12, in which the flake deposition source deposits the flake material layers to a film thickness from about 5 to about 500 angstroms.

20. (New) Apparatus according to claim 12, in which the release coat source comprises a wire feed mechanism in which the polymeric release coat material is coated onto a wire fed to the vacuum chamber and evaporated under heat therein to be deposited as said release coat layer.

21. (New) Apparatus according to claim 20, in which the wire feed mechanism delivers the coated release coat material to a heater block positioned adjacent the deposition surface for evaporating the release coat material.

22. (New) Apparatus according to claim 12, in which the release coat source comprises a heater block positioned adjacent the deposition surface and a carrier for delivering the release coat material to the heater block; and in which the flake deposition source comprises a thermal source for evaporating the flake material and directing it toward the deposition surface.

23. (New) A method for making and using nanoscale flakes comprising:

providing a vacuum deposition chamber containing a deposition surface;

providing a release coat source and a flake deposition source in the vacuum deposition chamber, each directed toward the deposition surface;

the release coat source and the flake deposition source controlled for depositing on the deposition surface under vacuum in alternating layers a vaporized polymeric release coat layer from the release coat source and vapor deposited discrete islands of flake material from the flake deposition source to build up in sequence a multi-layer vapor deposit of flake material layers comprising discrete islands of the flake material separated by and deposited on corresponding intervening release coat layers;

the release coat layers comprising a polymeric material which was vaporized under vacuum to form a smooth continuous

solvent soluble and dissolvable barrier layer and support surface on which each of the layers of flake material is formed;

the multi-layer vapor deposit removable from the vacuum deposition chamber for separating it into nanoscale flake particles by treatment with a solvent which dissolves the release coat layers and yields flakes with smooth, flat surfaces which are essentially free of the release coat material, and

using the nanoscale flakes for functional applications including barrier films, catalytic materials and optically reflective flakes; and use in coatings to reflect, scatter or absorb light; use in structural materials to improve mechanical properties; use in polymeric films containing larger particle-size flakes; and for imparting electrical properties to materials and coatings.

24. (New) The method according to claim 23 in which the flake material layers are deposited to a flake (discrete island) thickness of less than about 100 nanometers.

25. (New) The method according to claim 23 in which the release coat layer comprises a thermoplastic polymeric material.